United Nations ECE/ENERGY/2018/1

Economic and Social Council

Distr.: General
17 July 2018

Original: English

Economic Commission for Europe

Committee on Sustainable Energy

Twenty-seventh session
Geneva, 26–27 September 2018
Item 3(b) of the provisional agenda
Accelerating and deepening the transition to sustainable energy systems: Pathways to sustainable energy: status update

Pathways to Sustainable Energy- Status Report

Note by the secretariat

I. Introduction

1. During previous sessions of the Committee on Sustainable Energy (the Committee), member States endorsed the project "Pathways to Sustainable Energy" and requested the secretariat to take steps towards its implementation (ECE/ENERGY/99, paras. 79–81, and ECE/ENERGY/2016/7[1]). At its twenty-sixth session, the Committee requested a report on progress and preliminary results for presentation at its twenty-seventh session (ECE/ENERGY/113, para. 36).

2 The project concept note (ECE/ENERGY/2016/7) presented at the twenty-fifth session of the Committee on 28–30 September 2016 and a white paper (CSE-24/2015/INF.7) prepared for the twenty-fourth session of the Committee on 19–21 November 2015, provide further information about the background and the project proposal.

3. Project implementation is ongoing with a focus on the development of policy options and adaptive policy pathways, increasing stakeholder engagement and the preparation of future policy dialogues. This document seeks to inform the Committee on progress made since October 2016. It also provides a timeline for the major milestones (see the annex of this document).

[1] Further information can be found in a white paper prepared for the twenty-fourth session of the Committee (CSE-24/2015/INF.7) on 19–21 November 2015. http://www.unece.org/fileadmin/DAM/energy/se/pdfs/comm24/rd/CSE-24_2015_INF.7.pdf.

GE.18-11819(E)

1811819

Please recycle

4. The Committee will be asked to comment on achievements, provide input and recommendations for the implementation of the project, and endorse future activities (see Chapter VIII).

II. Background

5. Energy underpins most of the goals and targets of the 2030 Agenda on Sustainable Development (2030 Agenda), and the energy sector plays a critical role in finding solutions for both sustainable development and climate change mitigation. Since the universal agreement on the seventeen Sustainable Development Goals (SDGs) including the goal on sustainable energy "SDG 7" in 2015, countries have commenced with the implementation of the 2030 Agenda, however, at this stage, there is a gap between the agreed energy and climate targets and the strategies and systems that are being put in place today. Accelerated and more ambitious strategies and policies will be needed to fill the persistent gaps to achieve the 2030 Agenda, and in particular, energy will need to play an increasing role across various SDGs.

6. One conundrum is particularly relevant for the region of the United Nations Economic Commission for Europe (ECE), namely that there is not yet a universally accepted definition of "sustainable energy", nor that countries have agreed on a pathway to achieve energy for sustainable development. Therefore, for the ECE region, there is now an important opportunity to explore the implications of different sustainable energy pathways and to work with member States on policies and measures for attaining the 2030 Agenda.

7. Recognising this opportunity, at its twenty-third session, the Committee agreed on a project to enhance the understanding of sustainable energy policy drivers in ECE member States, based on a policy dialogue and robust stakeholder consultations and including awareness-raising of different outcomes that could emerge over time.

8. Following the initiation of the project, stakeholder engagement workshops were organized between 2015 and 2016 to discuss key uncertainties and influencing factors for the future of sustainable energy. This expert based scenario building approach led to the formulation of four distinct equally plausible futures, which are referred to as sustainable energy storylines. The storylines provide the qualitative backdrop and larger context for the scenario analysis.

9. The project "Pathways to Sustainable Energy" presented in this document combines the modelling of sustainable energy scenarios with the development of a monitoring and early-warning system concept that can assess progress in achieving sustainable energy targets. The scientific assessment could inform a policy-dialogue among ECE member States and ECE sub-regions to explore how targets can be achieved from different starting points and national priorities. The ultimate outcome of the project is the development of new strategic orientations, options and national actions to ensure the attainment of sustainable energy in the ECE region.

III. Objective of the project "Pathways to Sustainable Energy"

10. The project's goal is to strengthen the knowledge and capacities of countries to develop, implement and track national sustainable energy policies aligned with international agreements. On a higher level, it aims to contribute to climate change mitigation and sustainable development. To achieve this goal, the project aims to achieve three milestones:

(a) development of sustainable energy policy and technology options towards 2050 by means of modelling and other tools;

(b) development of an early-warning system if achievement of sustainable energy objectives is not on track; and

(c) facilitation of energy expert and policy exchange formats.

IV. The status of the project: October 2016 to June 2018

11. Three institutions will support the development of the modelling framework and scenario outputs: i) Fraunhofer Gesellschaft (Fraunhofer; represented by the Institute for Environment, Safety and Energy Technology – UMSICHT and the Institute for Systems and Innovation Research - ISI); ii) the International Institute for Applied System Analysis (IIASA); and iii) the Pacific North West National Laboratory (PNNL). The three institutions have been chosen based on their academic merits and their extensive experience and international recognition in the field of sustainable energy research. IIASA and PNNL will provide the modelling of the sustainable energy scenarios and the testing of policy options within them. Fraunhofer will provide the assessment of technology options to be used as input parameters within the scenarios.

12. The analysis of scenarios will be undertaken within both models to increase accuracy of modelling results and transparency in scenario formation. This will further be supported by Fraunhofer's analytical work comparing technology input parameters of both models with literature and with each other. Recommendations for adaptation of input assumptions will be put forward where necessary. Both models provide global results, the ECE perspective, and sub-regional results. The analysis of sub-region will in some cases be divided, in particular with IIASA providing more detailed analysis on the Eastern part of the ECE region.

13. Implementation of all activities across the three project components is ongoing. In first instance, the team focused on the development of the key parameters that will shape the analysis of scenario outcomes and strategic options for achieving sustainable energy and preparing the supporting quantitative analysis. In terms of scenario modelling, at this stage, the modellers have prepared the "No Policy Scenario", the "Current Policies including NDCs" and a "2-degree Celsius" scenario, (see details in Chapter IV.A). The Committee will be presented with intermediate results at its twenty-seventh session and will be invited to engage in a policy dialogue to shape further outcomes of the project.

14. A summary of the achievements for each of the three expected outputs is provided below. Informal document CSE-27/2018/INF.8 provides a detailed assessment of the implementation of each activity as outlined in the project concept note. A glossary of key vocabulary/terminology used for the project has been published online.[2] Further iterations of the document are likely and inputs are encouraged, as it will further narrow the definition of what is sustainable energy.

15. All activities have been overseen by the Bureau and a Technical Advisory Group (see details on the project governance in Annex Chapter I-B), with opportunities to provide input through online consultations and through the quarterly Bureau meetings.

[2] The glossary can be downloaded online: https://www.unece.org/energy/welcome/areas-of-work/pathways-to-sustainable-energy/resources.html

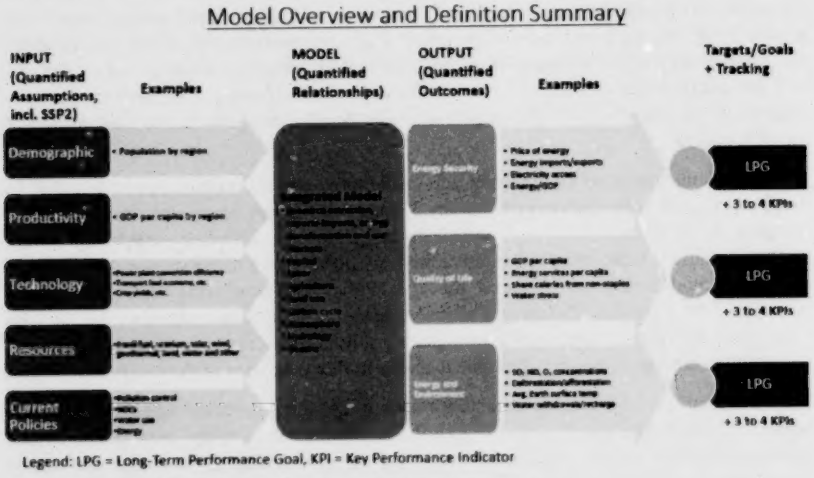
A. Modelling of sustainable energy scenarios

16. To support achievement of deliverable (i), existing energy models from IIASA and PNNL will be used to illustrate sustainable energy scenarios and pathways to 2050. IIASA's work is based on *the Model for Energy Supply Strategy Alternatives and their General Environmental Impact* (MESSAGE), while PNNL uses the Global Change Assessment Model (GCAM). Both models provide a framework for medium- to long-term energy system planning, energy policy analysis, and scenario development while allowing linkages to other sectors.

17. So far, the modelers have undertaken significant work to prepare and link the two models, including the disaggregation of ECE sub-regions and respective data, and the integration of current policies, for example existing energy and climate objectives and targets.

18. For the purpose of the modelling, the ECE region is divided into seven sub-regions. Analysis and presentation of results will be undertaken on sub-regional rather than on country level, with the principle outcomes being transferable to the national level. Modelling regions within MESSAGE include North America (NAM), Western Europe (WEU), Eastern Europe (EEU), Russian Federation, Central Asia, Caucasus and BMU (Belarus, Moldova, and Ukraine).

19. Figure (i) summarizes the modelling approach:



Legend: LPG = Long-Term Performance Goal, KPI = Key Performance Indicator

20. The scenario analyses will comprise three distinct stages:

(a) Base scenario (SSP2). This will act as the "No Policy Scenario";

(b) SSP2 + current policies (including NDCs, energy policies, etc.,). A policy scenario based on NDCs under the Paris Agreement for 2030 (NDCs kept beyond 2030 until 2100) with four cases along the two axes "International Cooperation" and "Innovation: technology, business models". These will act as the "Current Policies incl. NDCs Scenarios";

(c) Base + current policies + adaptive policy pathways to achieve targets (Key Performance Indicators (KPIs) and Long-Term Performance Goals (LPGs) including 2°C). These will be called "Sustainable Energy Policy Scenarios". In total, the modelers will develop 4-5 policy scenarios.

21. During the kick-off workshop of the modeler team in May 2017, in order to derive the baseline input assumptions, the modelers decided to build upon existing scenario work by using the Socio-Economic Pathways (SSPs) as base scenario. The advantage of using the SSPs is that they have been developed through various iterations by an international research community, including IIASA and PNNL, with the objective to provide five narratives describing alternative socio-economic developments and plausible major global developments. SSPs are used to analyse the feedbacks between climate change and socioeconomic factors and to develop scenarios for use by the research community. The SSPs include qualitative narratives and quantitative elements.[3]

22. To develop the project scenarios, basic socio-economic assumptions from SSP2 and respective datasets will be used. SSP2 will function as the base scenario ("No Policy Scenario") for each scenario developed under the Pathways project as it describes a "middle of the road" scenario. The development of the subsequent policy scenarios is linked to storylines that were developed through a participative approach with energy experts in 2015 and 2016.

23. The project further includes an activity that aims to assess in how far existing strategies can help to achieve the set energy and climate targets. ECE undertook the first assessment of the status of achievement of the three SDG 7 targets through the report "Global Tracking Framework: ECE Progress in Sustainable Energy".[4] Published in December 2017, the report summarizes the status of progress in achieving SDG7 and also provides an outlook if the progress is on track. The progress tracking initiative relates closely to the Pathways project in particular through the selection of KPIs and the definition of signposts (see Chapter IV-B) which partly represent SDG indicators. In addition to this tracking report, the scenario work will further help understand the gap between current policy-making and targets set by international agreements or on a national basis. The identification and testing of policy options will be used to formulate adaptive sustainable energy policy pathways and develop strategic recommendations that countries can consider in their future policy-making.

24. In order to increase transparency of input parameters used in the models, Fraunhofer prepared a technology survey.[5] Technologies included are: solar photovoltaics, concentrated solar power, wind, hydro, nuclear, coal-fired power plants, gas combustion, and biomass. The technology description highlights the technical description as well as the most common technology variations (e.g. thin film cells versus wafer based silicon cells) and a technological outlook for cost development and technical efficiency. The technology portfolio seeks to provide a general descriptive guide for the power generation technologies deployed in both models GCAM and MESSAGE. It will help compare and illustrate the differences within the set of assumptions regarding the technology assumptions used in both models and further relates the model values to existing literature values.

25. Both models used for the project have a similar cost hierarchy. This means that technologies on the lower or upper end of cost rankings are similar in both models. In the remaining project period for phase 1 until October 2019, Fraunhofer will prepare

[3] See detailed description of SSPs: Riahi K. et al (2017): The Shared Socioeconomic Pathways and their energy, land use, and greenhouse gas emissions implications: An overview. In: Global Environmental Change 42 (2017) 153–168.

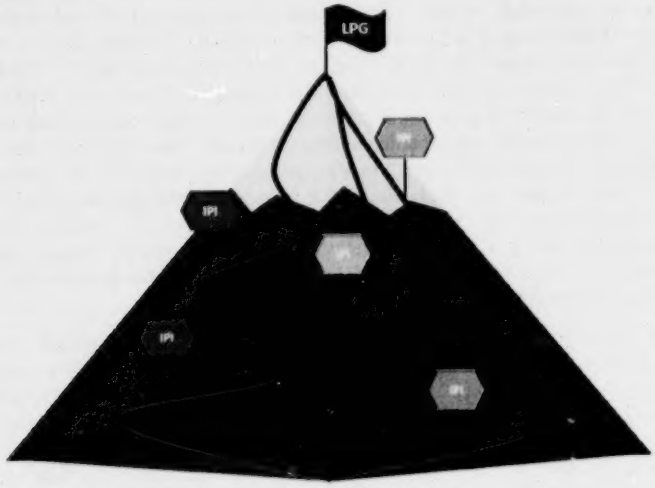
[4] The report can be downloaded online: https://www.unece.org/fileadmin/DAM/energy/images/CSE/publications/Global_Tracking_Framework-_UNECE_Progress_in_Sustainable_Energy.pdf

[5] The summary report „Technology Portfolio: Comparison of Technical Input Parameters from MESSAGE and GCAM" can be downloaded on the project website: https://www.unece.org/fileadmin/DAM/energy/se/pdfs/Pathways_to_SE/Report_Technology_Portfolio_UMSICHT_ISI_FINAL.pdf

technology zoom-ins for carbon capture and storage (CCS), storage, energy efficiency and power to X.[6]

B. Conceptualisation of an early-warning system

26. To support achievement of deliverable (ii), work is under way to define the different aspects of the early-warning system. The purpose of this system is to inform countries if achievement of sustainable energy objectives is not on track, and help identify the national status of moving towards the implementation of the 2030 Agenda and the Paris Agreements. Signposts and selected indicators will allow countries to track if their chosen policy actions prove to be successful, or if course corrections are required to achieve the 2030 Agenda. The early-warning system could further help assess the direction of a global scenario or pathway over time. Figure (ii) visualizes scenario development, highlighting different pathways that will ultimately lead to the same desired result:



Legend: LPG = Long-Term Performance Goal
KPI = Key Performance Indicator
IPI = Interim Performance Indicator (signpost)

27. As no universally agreed definition of sustainable energy exits, the project proposes the following working definition:

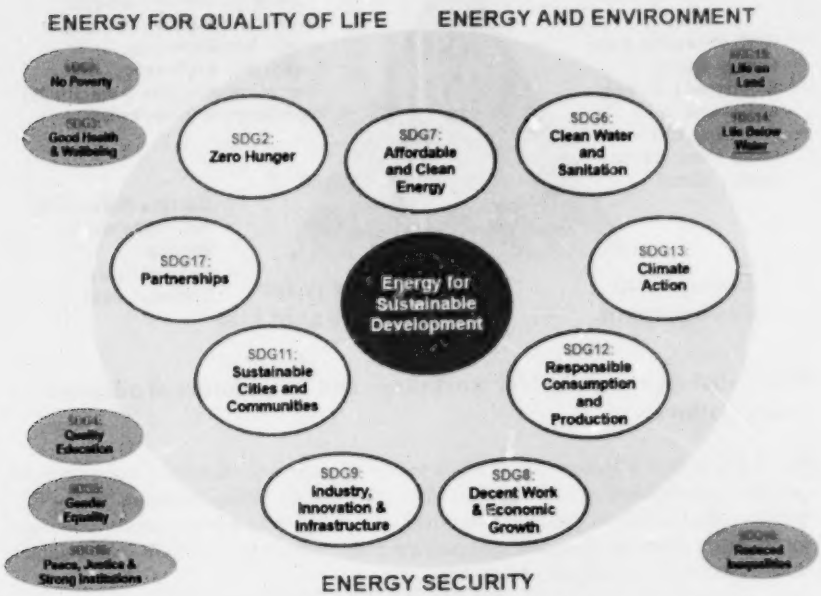
(a) Pillar I "Energy Security": Securing the energy needed for economic development;

(b) Pillar II "Energy for Quality of Life": Provide affordable energy that is available for all at all times;

(c) Pillar III "Energy and Environment": Minimize the impact of energy system on climate, ecosystems and health.

[6] Such as power-to-ammonia, power-to-chemicals, power-to-fuel, power-to-gas, power-to-heat, power-to-hydrogen, power-to-liquid, power-to-methane, power-to-mobility, power-to-power, and power-to-syngas. power to gas, power to hydrogen.

28. Figure (iii) seeks to visualise the relationship of the three sustainable energy pillars and the selected modelling metrics with the Sustainable Developments Goals (SDGs). Energy is the golden threat through the 2030 Agenda as achievement of all goals is directly or indirectly linked to the universal supply of sustainable energy. Some goals are more directly related to energy, such as SDG 19, SDG 11, and SDG 13, while others are influenced more indirectly.


ENERGY FOR QUALITY OF LIFE
ENERGY AND ENVIRONMENT
SDG1: No Poverty
SDG3: Good Health & Wellbeing
SDG2: Zero Hunger
SDG7: Affordable and Clean Energy
SDG6: Clean Water and Sanitation
SDG15: Life on Land
SDG14: Life Below Water
SDG17: Partnerships
Energy for Sustainable Development
SDG13: Climate Action
SDG11: Sustainable Cities and Communities
SDG12: Responsible Consumption and Production
SDG4: Quality Education
SDG5: Gender Equality
SDG16: Peace, Justice & Strong Institutions
SDG9: Industry, Innovation & Infrastructure
SDG8: Decent Work & Economic Growth
SDG10: Reduced Inequalities
ENERGY SECURITY

29. Two constraints[7] can be utilized in the implementation within the Policy Scenarios:

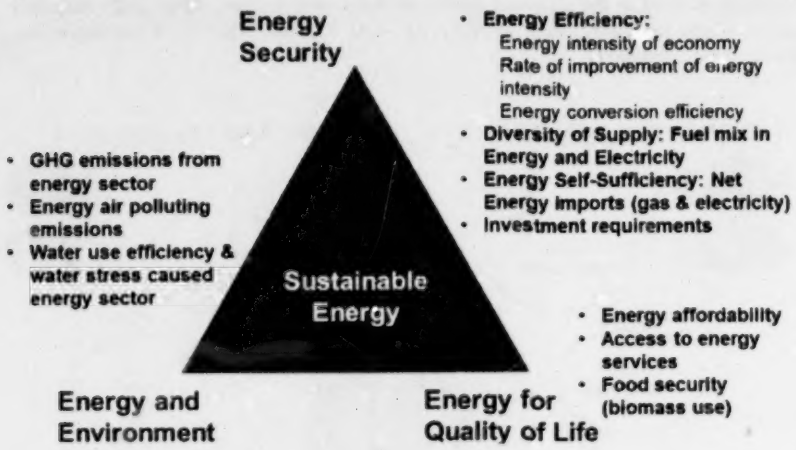
(a) Limit cumulative global greenhouse gas (GHG) emissions from the energy sector over the remainder of the 21st Century to stay below the 2oC maximum temperature limit;

(b) Reduce air polluting emissions from energy sector: Sulphur Dioxide (SO2), Nitrogen Oxides (NOx), Particulate Matter (PM2.5), possibly others; in ppm or µg/m3. Sub-regional specific targets can be established and implemented for the Policy Scenarios, if desired by the Committee.

30. Figure (iv) provides a simplified overview of selected metrics for each of the three sustainable energy pillars. The Committee will be presented with this preliminary selection of Key Performance Indicators (KPIs) that can be used in the models. The KPIs function mainly as output indicators, rather than input assumptions. The team selected three to four metrics across the three pillars to play a more prominent role in the scenario analysis and presentation within an ECE context. Some of these metrics will function as Long-Term Performance Goals, some others as Key Performance Indicators (see glossary). Some of them might also become signposts, however, the discussions are still ongoing, and the Expert Groups are requested to provide comments over the course of the remaining project period. The detailed list of metrics is summarized in the Annex. Chapter II "Draft List of Key Performance Indicators" The Committee will be requested to endorse the selected

[7] defined modelling outcomes in 2050, see glossary.

metrics, the constraints and the definition of sustainable energy. This will allow the finalisation of signposts and KPIs in the remaining half of the project implementation period.


Energy Security
• Energy Efficiency:
Energy intensity of economy
Rate of improvement of energy intensity
Energy conversion efficiency
• Diversity of Supply: Fuel mix in Energy and Electricity
• Energy Self-Sufficiency: Net Energy imports (gas & electricity)
• Investment requirements
• GHG emissions from energy sector
• Energy air polluting emissions
• Water use efficiency & water stress caused energy sector
Sustainable Energy
• Energy affordability
• Access to energy services
• Food security (biomass use)
Energy and Environment
Energy for Quality of Life

C. Policy dialogue, stakeholder workshops and formulation of adaptive policy pathway

31. The project's approach is strengthened by a continuous dialogue among countries and other stakeholders on how to attain sustainable energy. Policy dialogues among ECE member States as well as within ECE sub-regions have led to an increased understanding of countries on how to formulate and subsequently implement effective and equitable strategies and policies towards sustainable energy.

32. So far, countries have had the opportunity to share their understanding about how to achieve sustainable energy through a series of workshops. Such workshops include kick-off workshops, ECE-wide policy workshops, technical workshops to discuss modelling metrics and approaches, and the first sub-regional workshop for Central Asia, from 12–14 June 2018 in Kyrgyzstan.[8]

33. Additional research on policy options and existing literature on adaptive and cross-cutting policies will provide the link between different energy-relevant sectors and policy objectives. The Committee and its subsidiary bodies will be asked to provide inputs into the development and validation of policy pathways throughout the remaining project period (see Chapter VI).

[8] See workshop documentation: https://www.unece.org/energywelcome/committee-on-sustainable-energy/committee-on-sustainable-energy/energycommitteemeetings/committee-on-sustainable-energy/committee-on-sustainable-energy/2018/stakeholder-consultation-workshop-national-sustainable-energy-action-plans-scenarios-for-central-asia/docs.html

V. Major challenges and need for action

A. Need for increased stakeholder engagement

34. Over the course of the last year, the modellers, the Advisory Board and the Bureau have highlighted the need for additional sub-regional workshops to increase stakeholder engagement by inviting their contributions to the formulation of project results. Stakeholder engagement is further important to ensure that the set of scenarios and pathways provide useful, applicable and acceptable information for the highly diverse ECE member States.

35. Sub-regional workshops can be useful to deepen the discussion in a specific context. So far, the project team has only organized one sub-regional workshop in Central Asia. Sub-regional workshops intend to increase the understanding among countries about the differences in sustainable energy perspectives, seek to provide new insights into sub-regional approaches, and offer an opportunity to improve the models. This is particularly important for the four newly formed sub-regions within the MESSAGE model: Belarus-Moldova-Ukraine, Caucasus, Central Asia, and the Russian Federation, as the disaggregation of these sub-regions requires substantive additional research and formulation of modelling input assumptions.

36. For the remaining project period, the last opportunity for stakeholder engagement is given at the information and consultation workshop on 24 September 2018, and the sessions planned at 9th International Forum on Energy for Sustainable Development in Kiev from 12–15 November 2018 (see Chapter VI-B). To facilitate further stakeholder engagement and organize additional sub-regional workshops, additional funding is required.

B. Need for stronger involvement of subsidiary bodies in the formulation of policy pathways and the development of early-warning system indicators

37. The project has been presented to four Groups of Experts sessions, namely of renewable energy (GERE), energy efficiency (GEEE), coal mine methane (CMM) and cleaner electricity production from fossil fuels (CEP). While all the expert groups have expressed interest in further collaboration, their actual involvement is insufficient to lead to the development of robust policy formulations that would lead to sustainable energy and provide inputs on early-warning system signposts and indicators.

38. Now that intermediate project results are available, the involvement of the expert groups would contribute to the development of practical and solid recommendations in the respective field and would help test approach and recommendations in the widest manner. This could be done by either nominating dedicated "Pathways focal points" in each expert group, or by setting up a task force with representatives from each of the expert groups.

C. Project extension of phase I

39. The selection and contracting of the modelling institution took longer than expected. IIASA could only be recruited at end of April 2017, leading to a delay in the commencement of the modelling work of about six months.

40. The project has been extended to October 2019, taking into consideration a delayed start and the need for additional stakeholder engagement.

VI. Outlook: Milestones for the remaining project period (phase I until October 2019)

A. Policy dialogue at the twenty-seventh Committee session

41. The first Committee-wide policy dialogue about intermediary modelling results will be held at the twenty-seventh session. Member States will have the opportunity to comment on intermediate project results and to discuss policy options and potential sustainable energy policy pathways. The discussion will comprise the challenges and opportunities linked to any transition. The objective of the exchange is to initiate the work on adaptive policy pathways and early warning systems, milestones that are also part of phase I.

42. The dialogue with the Committee will allow the development of 4-5 policy scenarios that will be developed during the timeframe between 2018 and 2019. The Committee's inputs will further shape the project's work plan for the remaining deliverables, including further analysis through sub-regional, policy or technology deep dives, depending on the wishes of the Committee and available resources.

43. The forthcoming Committee session is therefore a unique opportunity to prepare the high-level political dialogue planned for the second half of 2019.

B. Stakeholder engagement workshops until October 2019

1. Pathways Workshop on 25 September 2018

44. A project workshop is planned on 25 September 2018, a day before the policy dialogue at the twenty-seventh session of the Committee. The workshop will allow member States and energy experts to understand the status of the project beyond what can be discussed in the short time during the Committee. Members of the project team will brief interested participants and invite reactions.

2. Several sessions about various angles of the project at the 9th International Forum on Energy for Sustainable Development (IFESD) in Kiev from 12–15 November 2018

45. Ukraine will host the 9th IFESD in Kiev from 12–15 November 2018. The proposal at the time of writing this document is to hold five sessions about the project: i) two sub-regional workshops, one for Belarus, Moldova and Ukraine and one for the Caucasus region; ii) a session on scenario results and policy pathways; iii) the role of renewable energy in sustainable energy pathways, and (iv) the early-warning system conceptualisation.

46. Additional funding for participant travel and speakers would maximize the outcome of all sessions.

3. Additional sub-regional workshop(s)

47. Subject to funding and country demand, additional sub-regional workshops could be organized between January and September 2019. Sub-regions could for example comprise North America, the Russian Federation, and Central and Eastern Europe.

48. The implementation of these additional tasks requires the availability of extra funding for participant and staff travel, staff and logistical support.

C. High-level policy dialogue, 2nd half of 2019

49. Building upon the outcomes from the Committee's policy dialogue at its twenty-seventh session, it is planned to evaluate the results of the scenario work and the policy pathways in a high-level policy dialogue format at the end of 2019 and subject to a host-country. At this stage, location, format and seniority of attendants are still undecided, and the Committee's views are welcome. Extrabudgetary funds will be required.

50. Ideally, such a high-level policy dialogue takes place in Q3 2019. One option is for the Committee to hold the dialogue in the context of its twenty-eighth session in Geneva. In preparation, the Committee could meet on 16 May 2019 to define the format, participants, content and location of the high-level policy dialogue. At that occasion, experts could refine the scenario results and adaptive policy pathways.

VII. Planning phase II (2019–2021)

51. The Committee has always stressed the need for continued dialogue about how to attain sustainable energy. As such, the project is only the starting point for more in-depth policy and technology analysis in the ECE region, and that with a view to developing recommendations for ECE countries on the different pathways that are available to achieve a desired future.

52. The current project – after the prolongation - will end in October 2019 if no further funding will be made available. At its twenty-seventh session, the Committee will be asked to recommend steps for the future and initiate planning for a potential phase II. A unique opportunity exists at this time to build upon the modelling structure that has been developed for ECE sub-regions. The model can now be used for a variety of outputs. The Committee is presented with the following initial set of ideas for additional activities. These are simply ideas to begin an exchange about the possibilities with the Committee and international experts and partners.

A. Regional and/or sub-regional deep dives

53. Additional sub-regional deep dives together with workshops, based on the results from phase I. Depending on demand, this analysis could include a deeper assessment of scenarios and their consequences in selected sub-regions, for example, Central Asia, with a focus on the energy-water-food-nexus challenges or scenarios on how to achieve energy security (energy self-sufficiency versus intraregional cooperation and trade). Another example could be the assessment and consequences of a combined European Union and Eurasian Economic Union market. Additional modelling work could focus on the country-level disintegration of selected sub-regions (e.g. Central Asia, Caucasus, etc.) to provide deeper analysis of countries' roles and opportunities in a sub-regional context. More country-specific scenarios and policy options could derive from this analysis. The approach could include partnering with other United Nations Regional Commissions.

B. Technological or subject-based deep dives

54. Additional analysis of existing scenarios in form of deep dives, with the possibility of a variety of topics. Suggested deep dives comprise affordability of energy; the cost of stranded assets (investment requirements in modernizing energy infrastructure); health (incl. air, food and water); disruptive technologies (hydrogen, power-to-gas (PtG) and power- to-liquid (PtL); renewable energy system integration including the role of gas; time

for diffusion and development of new technologies; resource availability for new technologies; digitalization and energy, including blockchain; energy productivity and energy efficiency; waste to energy; inter/intra-regional trade, regional cooperation and market integration; role of external influencers to the ECE region (e.g. China); biomass; infrastructure and infrastructure resilience.

C. Implementation of policy pathways

55. Support of the implementation of adaptive, cross-cutting and holistic policies in a sub-regional or national context, connected closely to any tracking initiatives of the 2030 Agenda implementation. Selected countries could be supported in identifying the most suitable policy pathway, and subsequently, receive support in the implementation of the chosen approach. This could further be linked to the tracking of SDG targets, such as SDG 7 (see also section VII(F)).

D. Capacity development

56. Selected countries and their stakeholders could be supported in developing skills on the model application and usage of modelling results for further purposes, to provide support in the analysis and assessment of policy options based on national circumstances, and the implementation of recommendations and policy pathways.

E. Application of the early-warning system

57. Establishment of an early-warning system in one or more pilot countries in cooperation with the Ministry of Energy and Statistical Office. This should include the set-up of the measurement, verification and reporting system to track signposts, assess progress towards achieving the sustainable energy goals and to test the functionality between adaptive policy pathways and signposts.

F. Tracking progress toward the achievement of sustainable energy

58. Development of a progress report tracking achievement of all energy-related SDGs as proposed by the project, including reporting on signpost data, and that further tracks implementation of suggested policy options. The set-up of a dedicated tracking progress task force under the Committee could be beneficial to lead this work. This work should be linked to the World Bank, IEA and IRENA led official SDG 7 progress tracking to which ECE contributed with a dedicated regional report in 2017.[9]

VIII. Conclusions

59. At its twenty-seventh session, the Committee will be invited to:

(a) endorse the definition of the sustainable energy objectives and the selected sustainable energy metrics across the three sustainable energy pillars as defined in this document;

[9] The report can be downloaded online: https://www.unece.org/fileadmin/DAM/energy/images/CSE/publications/Global_Tracking_Framework_-_UNECE_Progress_in_Sustainable_Energy.pdf

(b) make suggestions on policy pathway formulations and selected sub-regional or technical deep dives;

(c) request the increased involvement of its six subsidiary bodies and submission of inputs in preparation of the final project outputs, in particular through (1) research on existing policies, and suggestion for possible policy options in their respective area; (2) development of adaptive, cross-cutting and holistic policy options; and (3) reactions on targets, metrics, and signposts as basis for the early-warning system. Such feedback is requested no later than the preparatory meeting of the Committee on Sustainable Energy on 16 May 2019;

(d) endorse the organisation of a high-level policy dialogue in Sep-Oct 2019, and make recommendations on its location, content and format. Such a policy dialogue could be held during the twenty-eighth session of the Committee on Sustainable Energy in Geneva and would extend to at least half a day. Should a country step forward to host such a policy dialogue, the Committee requests the sustainable energy sub-programme to begin preparations under regular consultation with the Bureau;

(e) request an additional session of the Committee on 16 May 2019 to endorse policy recommendations for ministerial roundtables that will conclude the first phase of the project;

(f) discuss and propose activities for follow-up phases of the project beyond October 2019;

(g) recommend possible sources of funding for future activities; and

(h) empower its Bureau to decide on behalf of the Committee on all questions related to the implementation of the project.

Annex

Pathways to Sustainable Energy: General Project Information, Draft List of Key Performance Indicators and Timeline October 2016 to October 2019

I. Project set-up, management and steering

A. General project information

1. Project Title: Pathways to Sustainable Energy.

2. Project duration for phase I: 1 October 2016 to 31 October 2019.

3. The overarching objective of the project is "The capacities of ECE member states to develop, implement and track national sustainable energy policies aligned with international agreements are increased and contribute to climate change mitigation and sustainable development". To achieve this objective, the Committee agreed on the definition of three expected accomplishments:

1. Output 1: Modelling of Sustainable Energy Scenarios

4. Results from the modelling of sustainable energy scenarios for the ECE region enable the identification of policy options and inform national energy strategies of member States.

2. Output 2: Conceptualisation of an Early-Warning System

5. A mechanism tracking implementation of international climate and sustainable development agreements is conceptualised and information is disseminated to member States.

3. Output 3: Policy Dialogue and Formulation of Adaptive Policy Pathways

6. The understanding and capacities of national energy ministries to develop, implement and track national sustainable energy strategies is increased, adaptive policy pathways are developed, and a regional dialogue exchange format is established.

B. Project governance and management

7. The Committee on Sustainable Energy oversees the project and provides steering and guidance to its implementation during its annual sessions. As an intergovernmental body, the Committee functions as the mandate giving body that provides overall strategic decision-making. In between sessions, the Bureau of the Committee provides steering and receives regular updates of the implementation progress by the secretariat, as requested by the Committee in its earlier sessions.

8. The secretariat set up a Technical Advisory Board, which consists of members that allow a broad representation of the ECE region in terms of sub-regions as well as institutional background, including public and private sector, civil society and academia.[10]

[10] The members of the Advisory Board can be seen on the project website: https://www.unece.org/index.php?id=46917.

The Advisory Board provides substance knowledge and feedback on preliminary results and proposals and acts as a sounding board.

9. At this stage, three donors support the project financially: Germany, the Russian Federation, and the United States. Funds are dedicated to the modelling institutions to support the implementation of the project until the end of phase I (see next paragraph), to support limited participant travel to attend regional stakeholder workshops and policy dialogues and to project management undertaken by the secretariat (four-person months).

10. Fraunhofer ISI and UMSICHT, IIASA as well as PNNL will support the implementation of activities across all three output areas. IIASA and PNNL will provide the modelling of the sustainable energy scenarios and Fraunhofer will provide the assessment of technology options to be used within the scenarios. Figure (v) summarizes the cooperation among the three organisations.

11. The secretariat is responsible for the day-to-day project management to coordinate modellers, implement activities as outlined in the concept note, facilitate stakeholder engagement and represent the project at events, and conduct monitoring and reporting tasks.

12. The project seeks to include a broad range of stakeholders and is open for the contribution and participation of additional partners, donors and experts.

II. Draft list of Key Performance Indicators (KPIs)

A. Pillar I: Energy security

1. Energy Efficiency, expressed through three metrics:

13. (1) Energy intensity: units of energy per unit of GDP (in Joule per US$ Purchasing Power Parity (J/US$ PPP)) (SDG7.3 indicator); (2) Rate of improvement in energy intensity (CAGR – Compound annual growth rate) (SDG7.3 indicator); and (3) Conversion efficiency. The chosen metrics relate to the SDG 7.3 target „double the rate of improvement in energy efficiency by 2030", and will be interpreted in the context of both thermodynamic conversion efficiency as well as the energy efficiency of the economy.

2. Fuel Mix in Energy and Electricity

14. Expressed as share of different fuels in Total Final Energy Consumption (TFC) and Total Primary Energy Supply (TPES), and in electricity, in percentage. The metric relates to the SDG 7.2 target „substantially increase the share of renewable energy in TFC", and will be interpreted in the context of diversification of energy supply and the share of low-carbon / fossil fuel energy supply.

3. Net Energy Imports

15. Expressed as net imports in each sub-region and overall ECE region for all essential fuel. The metric relates to SDGs 8 and 9, and will be interpreted in the context of regional cooperation, interconnectivity and energy self-sufficiency.

4. Investment requirements to achieve sustainable energy

16. Expressed as energy investment of GDP, in percentage. The metric relates to SDG 7.A., and SDG 13.A. and will be interpreted in the context of impacts and financeability.

B. Pillar II: Energy and environment

1. Total GHG emissions from the energy sector

17. Expressed as total global GHG emissions of the energy sector in MtCO2eq. The metric is implemented as a modeling constraint, and further relates to SDG 13. The target value is to "limit cumulative total global greenhouse gas emissions of the energy sector over the remainder of the 21st Century to stay below the 2°C maximum temperature limit. (about 890-900 Gt CO2)".

2. Air polluting energy emissions

18. Expressed as emissions from the energy sector: Sulphur Dioxide (SO2), Nitrogen Oxides (NOx), Particulate Matter (PM2.5); in ppm or µg/m3. The metrics relate to SDG 3.9.1. If the Committee desires, it is possible to implement emission targets as modeling constraints for the different sub-regions as part of the policy scenarios.

3. Water use efficiency and water stress caused by the energy sector

19. Expressed through two metrics: (1) Cooling water use of electricity generation (l/kWh), and (2) water use associated with energy resource extraction (in terms of GJ liters absolute and/or L/GJ). The metric relates to SDG 6.4.1 "substantially increase water use efficiency", and 6.4.2 „substantially reduce water scarcity ". The metrics will be interpreted in the context of water use of the energy sector in power generation and water consumption from energy extractive industries.

C. Pillar III: Energy for quality of life

1. Energy affordability

20. Expressed as total energy expenditures per GDP per capita. The metric relates to SDG 1 and SDG 7, and will be interpreted in the context of energy poverty and household income spent on energy expenditures.

21. The Bureau expressed as a desired target range for the output value: Maximum 10% of disposable income spent on energy expenditures.

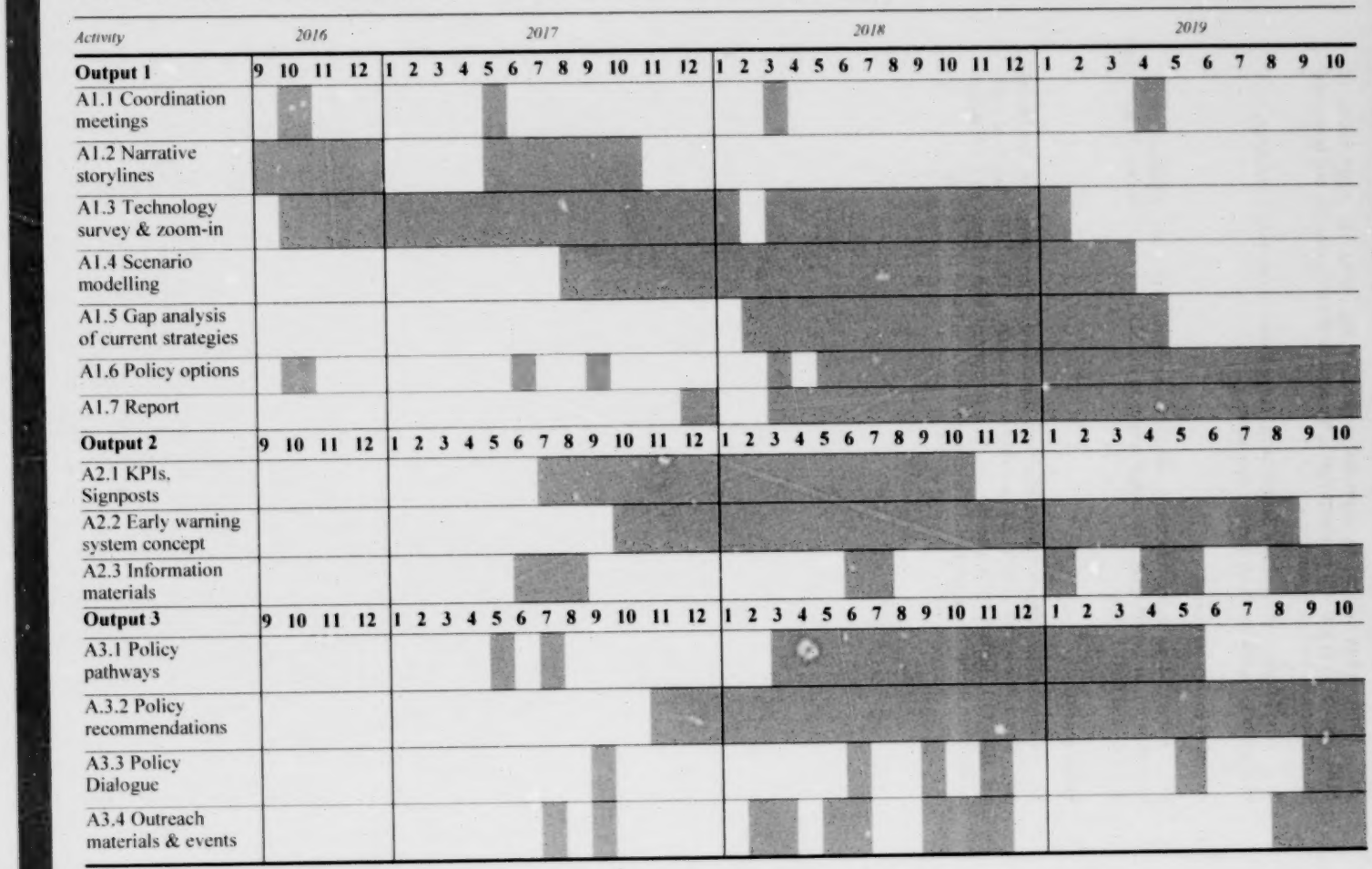
2. Access to energy services

22. Expressed as energy/electricity services per capita (efficiency adjusted energy consumption), in J/capita/year. The metric relates to the SDG 7.1 target "universal access by 2030" and SDG 1.

3. Food security

23. Expressed as share of calories from non-staple food, in percentage (GCAM model only). The metric relates to SDG 2.4 (sustainable agriculture), SDG 2.3 (reduce food loss), and SDG 13.1 (impact of climate change). It is interpreted with a focus on the linkages between sustainable bioenergy (solid biomass) generation and food production.

III. Draft Activities Timeline October 2016 – October 2019 (Phase I)


Activity
2016
2017
2018
2019
Output 1
9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10
A1.1 Coordination meetings
A1.2 Narrative storylines
A1.3 Technology survey & zoom-in
A1.4 Scenario modelling
A1.5 Gap analysis of current strategies
A1.6 Policy options
A1.7 Report
Output 2
9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10
A2.1 KPIs, Signposts
A2.2 Early warning system concept
A2.3 Information materials
Output 3
9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10
A3.1 Policy pathways
A.3.2 Policy recommendations
A3.3 Policy Dialogue
A3.4 Outreach materials & events